Temporal work stressors and satisfaction with work, life and health among health professionals in Switzerland

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Abstract: BACKGROUND: Working in a hospital can be both rewarding and stressful. Whether one or the other is dominant depends on a number of factors ranging from shift work, physical demands, responsibilities and time pressure to job autonomy, work climate and leisure time. AIM: This study aimed to examine associations between temporal work stressors and satisfaction with work, life and health among health professionals in general, and nurses and physicians in particular. Associations were further investigated for possible mediating and intervening factors. METHODS: Cross-sectional survey data on 1232 health professionals at three public hospitals and two rehabilitation clinics were collected in 2015/2016. Stepwise multiple linear regression analyses were used to estimate the standardised effects (beta coefficients) of temporal work stressors (overtime and time pressure), and organisational and personal resources (job autonomy, work climate, internal control belief) on general stress as the assumed mediator and finally on satisfaction with work, life and health. RESULTS: Temporal work stressors were found to strongly predict general stress symptoms among health professionals (= 0.25) and particularly physicians (= 0.30), independently of the observed stress-buffering effects of organisational resources such as job autonomy (= −0.09) or work climate (= −0.22). Associations between temporal work stressors (as predictors) and satisfaction with work, life and health (as outcomes) turned out to be mostly indirect, mediated by general stress. General stress in turn was observed to be the strongest predictor of domain-specific satisfaction (= −0.17 to −0.34), sometimes only surpassed by resources such as work climate or internal control belief. Explained variance of the three satisfaction outcomes in the fully specified regression or explanatory models ranged between 14% and 45% depending on the (sub-)sample (nurses, physicians, all health professionals) or the outcome. Control belief was revealed to be a strong and independent personal resource, particularly regarding satisfaction with life and health in general (= 0.25/0.21). CONCLUSION: Satisfaction and well-being of health professionals are strongly affected by job stressors such as frequent or excessive overtime work or permanent time pressure at work. Negative consequences of temporal work stressors are attenuated by organisational and personal resources such as a high level of job autonomy, a good work climate or a strong internal control belief.

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Temporal work stressors and satisfaction with work, life and health among health professionals in Switzerland

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Summary

BACKGROUND: Working in a hospital can be both rewarding and stressful. Whether one or the other is dominant depends on a number of factors ranging from shift work, physical demands, responsibilities and time pressure to job autonomy, work climate and leisure time.

AIM: This study aimed to examine associations between temporal work stressors and satisfaction with work, life and health among health professionals in general, and nurses and physicians in particular. Associations were further investigated for possible mediating and intervening factors.

METHODS: Cross-sectional survey data on 1232 health professionals at three public hospitals and two rehabilitation clinics were collected in 2015/2016. Stepwise multiple linear regression analyses were used to estimate the standardised effects (beta coefficients) of temporal work stressors (overtime and time pressure), and organisational and personal resources (job autonomy, work climate, internal control belief) on general stress as the assumed mediator and finally on satisfaction with work, life and health.

RESULTS: Temporal work stressors were found to strongly predict general stress symptoms among health professionals (β = 0.25) and particularly physicians (β = 0.30), independently of the observed stress-buffering effects of organisational resources such as job autonomy (β = −0.09) or work climate (β = −0.22). Associations between temporal work stressors (as predictors) and satisfaction with work, life and health (as outcomes) turned out to be mostly indirect, mediated by general stress. General stress in turn was observed to be the strongest predictor of domain-specific satisfaction (β = −0.17 to −0.34), sometimes only surpassed by resources such as work climate or internal control belief. Explained variance of the three satisfaction outcomes in the fully specified regression or explanatory models ranged between 14% and 45% depending on the (sub-)sample (nurses, physicians, all health professionals) or the outcome. Control belief was revealed to be a strong and independent personal resource, particularly regarding satisfaction with life and health in general (β = 0.25/0.21).

CONCLUSION: Satisfaction and well-being of health professionals are strongly affected by job stressors such as frequent or excessive overtime work or permanent time pressure at work. Negative consequences of temporal work stressors are attenuated by organisational and personal resources such as a high level of job autonomy, a good work climate or a strong internal control belief.

Keywords: *control belief*, *general stress*, *job autonomy*, *overtime*, *job satisfaction*, *life satisfaction*, *satisfaction with health*, *time pressure*, *work climate*

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Introduction

Working conditions in hospitals are often characterised as stressful and detrimental to health [1, 2]. In addition to stress, which is prevalent in health professions, general working conditions also have a considerable impact on employees' job satisfaction. Health professionals are exposed to a number of physical and psychological stresses and strains [3]. Challenges are diverse and involve physical demands (e.g., heavy lifting, standing or sitting for long periods) [4], rotating in shift work [5–7], high responsibility, and frequent interruptions and disturbances at work [8, 9]. Other challenges include role ambiguity [10], patients' concerns and expectations [11, 12], and experiences of violence or other social conflicts at work [13]. Importantly, the limited time available for interacting with patients who suffer from multiple chronic conditions (multimorbidity) is one of the key issues [14]. A recent Swiss study documented how internal medicine residents spend their time at work and found high work compression: for every hour the residents interacted with patients, they spent an average of 5 hours on other tasks [15]. About half the workday was spent using a computer. Another study reported that physicians are constantly exposed to high time pressure, with additional stress due to overtime [16]. Another problem is that these burdens on health professionals can lead to negative consequences that compound the existing time pressure. Physicians frequently report sleep problems (sleep

deprivation and fragmentation) [17], which arise from a set of work demands, such as umpteen night or weekend shifts, irregular and long extra hours, and research activities during leisure time. Some researchers also refer to physicians' fatigue [18, 19], which has potential negative consequences on resident health, safety, well-being or patient care [17].

Shortage of personnel and the increasing lack of qualified health professionals (young talents vs leaving the profession) are well-known problems. The European NEXT study in which 10 EU countries took part investigated the causes of early retirement from the nursing profession. The study found a clear link between unfavourable working conditions and intended retirement [20]. A survey estimated the proportion of physicians (Swiss medical graduates of the diploma years 1980 to 2009) who had left patient care to be almost 13% [21]. For physicians who changed professions before becoming specialists, workload demands were the most reported reason for leaving [21]. Women left patient care more frequently and earlier than their male colleagues as a result of a higher work-life imbalance.

Work-related stressors and buffering resources make up the framework conditions that can have a positive and/or negative impact on the health of the working population. A recent meta-analysis showed the relationship between long working hours and impact on health. The risk of stroke (33%) was increased for long working hours (significant for 55 hours per week and longer) compared with normal working hours [22]. The longer the working week, the stronger the association was. Behavioural risk factors such as lack of exercise or unhealthy living conditions (e.g., smoking, alcohol) were discussed as confounders [23]. Long and maximum working hours often allow little to almost no time for other activities that take place outside work in life. Increasingly, there has been a change and a demand for a better balance between work, leisure and family life [24]. Acute or chronic stress results when there is an imbalance between stressors, resources and coping strategies. Based on the job demand-control model of the American sociologist Robert Karasek, it is assumed that a high job strain is the result of high job demands on the one hand and limited job autonomy on the other [25]. In addition to this concept, the job demands-resources model proposes that working conditions should be categorised into demands and resources [26]. Accordingly, health-promoting resources at the workplace, such as high job autonomy, a good working atmosphere and collegiality, should counter given pressures [27, 28]. Moreover, personality characteristics are of growing research interest. Some authors consider control beliefs as a relevant resource for stress management [29]. The psychosocial construct of control belief was developed by Rotter [30] in the 1960s as characteristic of an individual's learned expectations.

The improvement of working conditions or rather the reduction of certain workloads should be systematically researched [1, 31, 32], especially regarding health professionals' satisfaction with life and individual health beyond work. Working conditions relevant for the health and well-being of hospital employees have been investigated in the Swiss survey "Work and Health in Hospital"; burnout [33], informal caregiving and other work-privacy conflicts were examined in preceding studies of that survey [34, 35].

This study aimed to assess the impact of temporal work stressors (overtime, time pressure) on the health and well-being of health professionals (satisfaction with work, life and health). We investigated whether general stress mediates this relationship and whether organisational (job autonomy, work climate) and personal resources (control belief) diminish the consequences of such stressors on work, life and health satisfaction.

The following research questions were addressed:

1. Is there a direct association between temporal work stressors and satisfaction with work, life, and health, or is there a more indirect association, mediated by general stress?
2. Do organisational resources buffer potential negative effects of temporal work stressors on general stress and/or satisfaction with work, life, and health?
3. Does the individual resource control belief show a relationship to outcomes beyond temporal work stressors or general stress?

Materials and methods

Sample and procedure

Cross-sectional data from an employee survey (conducted in 2015/16) on working conditions and health among hospital employees in German-speaking Switzerland (n = 1840) were used. The study population was restricted to 1232 health professionals with information on all variables of interest. Overall, the response rate was slightly over 40%. The anonymous questionnaire contained 100 questions concerning different work, health or life domains (e.g., working conditions, personal resources, health and well-being). The data were from five hospitals, including one university hospital, one cantonal hospital, one district hospital and two rehabilitation clinics. Hospitals varied in size from around 480 to 2200 employees. Survey participation was voluntary and anonymous. This completely anonymous survey required no ethics approval. The survey data do not allow any conclusion about the identity of the respondents.

Measures

Temporal work stressors

Measures of two different aspects of temporal workload were used as exposure variables: overtime and time pressure. Overtime was assessed by the self-reported number of extra hours worked during a standard week, ranging from 0 to 1–2, to 3–5, to 6–10 and to more than 10 extra hours per week. Time pressure was measured by a single Likert-scaled item: "Due to the heavy workload, there is often a lot of time pressure." Survey respondents were asked to what extent they agreed or disagreed with the statement, with four suggested responses ranging from 0 ("completely disagree") to 3 ("completely agree").

Organisational resources

For organisational resources, scales on job autonomy and work climate were used, which were taken from the

Copenhagen Psychosocial Questionnaire (COPSOQ) by Kristensen, Hannerz, Høgh and Borg [36]. To assess job autonomy, a multiple-item measure was used. The scale contained eight questions (e.g., "Can you influence the amount of work assigned to you?"), with response options ranging from 0 to 4 ("never/almost never", "seldom", "sometimes", "often", "always"). Other items used were: being able to decide when to take a break, being able to decide with whom to work with or being able to take holidays more or less as wished, etc. Sum scores of 0 to 8 were classified as a "low", 9–16 as a "moderate", 17–24 as a "high", and 25–32 as a "very high" level of job autonomy.

To measure work climate, six items on the self-rated working atmosphere with colleagues, feeling of being part of a collective, etc. were used, with response options ranging from 0 to 4 ("never/almost never", "seldom", "sometimes", "often", "always"). Sum scores of 0–12 were classified as a "poor", 13–15 as a "moderate", 16–18 as a "good", and 19–24 as a "very good" work climate.

Personal resources

Control belief (internal locus of control) was assessed with the two items "I am in control of my life" and "If I make an effort, I will succeed" as used in the brief version of the IE-4 scale [37]. Response options ranged from 0 to 3 ("doesn't apply at all", "applies somewhat", "applies mostly", "applies completely").

Outcome variables

The outcome variables used were general stress and satisfaction with work, life and health. General stress was indicated by answering the unspecified question [38]: "Stress describes a state in which a person feels strained, restless, nervous, anxious or unable to sleep at night because his or her thoughts are agitated. Do you currently experience this kind of stress, and to what extent?" Response options ranged from 0 to 4 ("feel no stress", "feel minor stress", "feel moderate stress", "feel strong stress", "feel very strong stress").

Satisfaction with work, life and health in general was measured by a single question each: "How satisfied are you in general with your work/life/health?" Each question was rated on an 11-point response scale from 0 ("not satisfied at all") to 10 ("completely satisfied"). The single question about satisfaction with work stems from the Swiss Health Survey (SHS) conducted in 2012 by the Swiss Federal Statistical Office [39]. The questions on satisfaction with health and life were available from the survey Statistics on Income and Living Conditions (SILC) [40].

Demographic characteristics (control variables)

Age (surveyed across five age groups: <25, 25–34, 35–44, 45–54, and 55+ years), gender, and job status were considered as control variables. Job status was measured as two categories: regular staff vs supervisory staff. The question was derived from the Swiss Household Panel (SHP), an ongoing longitudinal study in Switzerland [41].

Analyses

For the statistical analyses, IBM SPSS Statistics (v. 25; SPSS Inc, Chicago, IL) was used. Data analyses were carried out for all health professionals and stratified for nurses and physicians. Descriptive statistics of all measures were generated. Dichotomous variables were dummy coded. Significance levels were reported. The job autonomy, work climate and control belief scales, with their sum scores ranging from 0–32 (job autonomy; eight items; Cronbach's alpha 0.8), from 0–24 (work climate; six items; Cronbach's alpha 0.6) and from 0–6 (internal locus of control; two items; Cronbach's alpha 0.5), were used for more differentiated linear regression analyses. To compare the relative importance of each coefficient in the regression model, standardised beta coefficients were reported. The beta coefficient for a regression denotes the slope, that is, by how much the target variable (dependent variable) increases by an additional unit of the influencing variable (independent variable). If the beta coefficient is negative, the interpretation is that for every unit increase in the influencing variable (e.g., overtime), the independent variable (e.g., job satisfaction) will decrease by the beta coefficient value. In this context, standardised means that beta coefficients have standard deviations as their units (z-scores for comparability also in the case of different units of variables).

The association between temporal work stressors and general stress and satisfaction with work, life, and health as outcomes was assessed by using stepwise multiple linear regression analyses. Figure 1 presents the explanatory model underlying the hypothesised relationships.

Step 0 estimated the relationship between overtime and time pressure (as independent or exposure variables) and satisfaction with work, life and health (as outcome variables). In step 1 of the regression analyses, the relationship between overtime and time pressure was estimated as independent or exposure variables and general stress as the dependent variable. Step 2 was analysis of the correlation between the variables job autonomy / work climate and general stress. This step was necessary to test whether the organisational resources can buffer the potential negative effects of the temporal work stressors on general stress. Next (in step 3), general stress was included as exposure variable to investigate the extent to which general stress is associated with the satisfaction outcomes. In step 4, control belief was included to test whether it is a personal resource with regard to satisfaction and the other variables in the model. In all steps, age, gender and job status were controlled for. By performing this five-step regression analyses it was possible to test for general stress as a potential mediator in this association. Mediation analyses followed the approach by Baron and Kenny [42]. A mediator variable is a variable that is related to both the independent and the dependent variable. To support mediation, the following conditions must be met (with overtime and time pressure as the two independent variables):

- The independent variable is a predictor of the dependent variable (step 0).
- The independent variable is a predictor of the mediator variable (step 1).
- The mediator variable is a predictor of the dependent variable (step 3) and the predictive effect of the independent variable now disappears or is greatly reduced.

Mediation is described as complete if the prediction of the independent variable is no longer significant after inclu-

sion of the mediator in the regression model. Partial mediation has to be considered if the effect on the dependent variable is only reduced.

Results

Descriptive statistics

The majority of the final study sample (table 1) were health professionals including nurses (57%), physicians (18%), and therapists, midwives, medical or technical personnel (24%). At the time of the survey, 66% of the physicians and 55% of the nursing professionals were between 25 and 44 years old. Almost 35% of the physicians interviewed were male. Nurses were predominantly female (more than 90%). Higher occupational positions were found in 59% of the physicians and 18% of the nursing professionals.

Regular overtime of 6 and more hours per week was reported by almost one third of the interviewed physicians (table 2). Usually no overtime was reported by approximately 37% of the nurses and less than 19% of all physicians. Time pressure was reported by 86% of physicians and 79% of the nurses. As expected, high levels of job autonomy were significantly more frequently reported by physicians (nearly 40%) than by nurses (exactly 20%). Work climate was largely classified as good or very good by about four fifths of the study sample. Internal control beliefs were expressed by the majority of the health professionals. Overall, 19% of the physicians and 14% of the nurses reported a very high level of general stress. Less than 20% of all health professionals mentioned no general stress. Satisfaction with life was rated similarly by the respective groups, whereas satisfaction with health was rated as lower by nurses.

Multivariate regression analyses

As outlined, a multiple linear regression analysis was conducted. The results were tested for multicollinearity. The absolute value of Pearson's correlation was close to 0.31 for the independent variables overtime and time pressure, indicating that collinearity is unlikely to exist.

As table 3 shows, temporal work stressors were found to strongly predict general stress symptoms among health professionals ($\beta = 0.25$) and particularly physicians ($\beta = 0.30$), independently of the observed stress-buffering effects of organisational resources such as job autonomy ($\beta = -0.09$) or work climate ($\beta = -0.22$). Overtime was not significantly related to physicians' general stress, but high time pressure was ($\beta = 0.37$). The beta coefficient of 0.37 means that for each one-unit increase in the predictor vari-

Figure 1: Explanatory model for the prediction of health and well-being among health professionals.

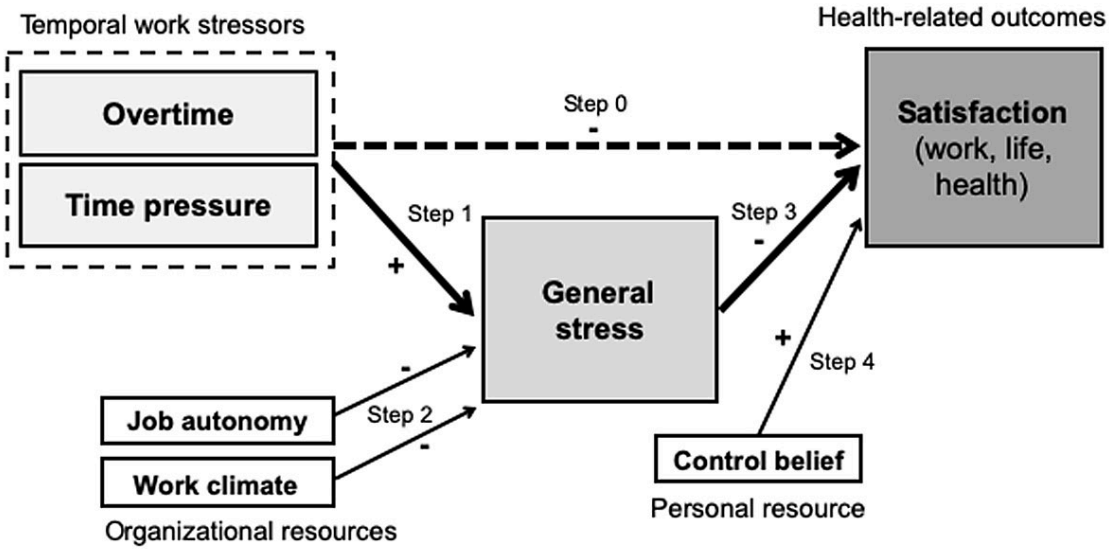

Table 1: Demographic characteristics of all health professionals and among nurses and physicians.

		Nurses (n = 705)	Physicians (n = 222)	All health professionals (n = 1232)
		n (%)	n (%)	n (%)
Age groups, years	<25	72 (10.2)	2 (0.9)	81 (6.6)
	25–34	214 (30.4)	72 (32.7)	400 (32.6)
	35–44	171 (24.3)	74 (33.6)	326 (26.5)
	45–54	162 (23.0)	45 (20.5)	273 (22.2)
	55+	85 (12.1)	27 (12.3)	148 (12.1)
Gender	Female	662 (94.4)	145 (65.3)	1071 (87.2)
	Male	39 (5.6)	77 (34.7)	157 (12.8)
Job status	Ordinary employees (regular staff)	573 (81.5)	90 (40.9)	893 (73.0)
	Superiors, managers (supervisory staff)	130 (18.5)	130 (59.1)	330 (27.0)

able (time pressure), the outcome variable (general stress) will increase by 0.37 units. Results further revealed that job autonomy was not a significant predictor for general stress in physicians. The data also showed that a better work climate in general was related to less general stress in all health professionals.

Moreover, associations between temporal work stressors (predictors) and satisfaction with work, life, and health (outcomes) turned out to be mostly indirect, mediated by general stress (tables 4a–c). General stress, in turn, was observed to (most) strongly predict domain-specific satisfaction ($\beta = -0.17$ to -0.34), sometimes only surpassed by resources such as work climate or internal control belief. Explained variance of the three satisfaction outcomes in the fully specified regression or explanatory models ranged between 14% and 45% depending on the (sub-)sample (nurses, physicians, all health professionals) or the outcome. Organisational resources (job autonomy and work climate) were found to have little to no buffering effect in relation to life satisfaction as an outcome, except in physicians (table 4b). Control belief was a strong and independent personal resource in particular for satisfaction of all health professionals with their life and health (table 4c) in general ($\beta = 0.25/0.21$).

General stress emerged as the strongest predictor of *dis*satisfaction by far in all health professionals and the two subsamples of physicians and nurses. The association was strongest for satisfaction with health as the outcome. As a predictor, only general stress was significant and decisive in this context.

Table 2: Temporal work stressors, organisational and personal resources, general stress and satisfaction among health professionals.

	Nurses (n = 705)		Physicians (n = 222)		All health professionals (n = 1232)	
	Mean (SD)	**n (%)**	**Mean (SD)**	**n (%)**	**Mean (SD)**	**n (%)**
Overtime hours						
No regular overtime (0)		256 (37.3)		40 (18.5)		396 (32.9)
1–2 long hours/week (1)		308 (44.8)		51 (23.6)		491 (40.8)
3–5 long hours/week (2)		104 (15.1)		55 (25.5)		207 (17.2)
6+ long hours/week (3, 4)		19 (2.8)		70 (32.4)		109 (9.1)
Time pressure						
Fully disagree (0)	2.0 (0.72)	13 (1.9)	2.1 (0.64)	1 (0.5)	2.0 (0.72)	24 (2.0)
Disagree (1)		135 (19.3)		30 (13.7)		256 (20.9)
Agree (2)		380 (54.2)		128 (58.4)		660 (53.9)
Fully agree (3)		173 (24.7)		60 (27.4)		284 (23.2)
Job autonomy	12.4 (4.95)		15.2 (5.81)		14.0 (5.64)	
Low (0–8)		152 (22.1)		28 (13.1)		204 (17.0)
Moderate (9–16)		398 (57.8)		101 (47.4)		620 (51.7)
High (17–24)		126 (18.3)		69 (32.4)		323 (26.9)
Very high (25–32)		12 (1.7)		15 (7.0)		52 (4.3)
Work climate	18.2 (2.85)		17.3 (3.18)		17.8 (2.99)	
Poor (0–12)		22 (3.2)		15 (6.9)		50 (4.2)
Moderate (13–15)		89 (12.9)		40 (18.3)		205 (17.0)
Good (16–18)		254 (36.7)		86 (39.4)		443 (36.8)
Very good (19–24)		327 (47.3)		77 (35.3)		506 (42.0)
General stress	1.4 (0.97)		1.6 (1.02)		1.5 (0.99)	
Never (0)		126 (18.8)		35 (16.3)		213 (18.1)
Low (1)		229 (34.2)		71 (33.0)		394 (33.4)
Medium (2)		83 (33.5)		69 (32.1)		397 (33.7)
(Very) high (3, 4)		7 (13.5)		40 (18.6)		175 (14.8)
Control belief (internal)	4.4 (1.09)		4.3 (1.20)		4.4 (1.13)	
Low (0–2)		28 (4.0)		13 (5.9)		58 (4.8)
Moderate (3, 4)		337 (48.2)		124 (56.1)		614 (50.3)
High (5, 6)		334 (47.8)		84 (38.0)		549 (45.0)
Satisfaction with work	7.6 (1.38)		7.7 (1.52)		7.6 (1.39)	
Low (0–5)		62 (8.8)		23 (10.5)		102 (8.3)
Medium (6–8)		480 (68.1)		130 (59.4)		812 (66.1)
High (9, 10)		163 (23.1)		66 (30.1)		315 (25.6)
Satisfaction with life	7.7 (1.50)		7.6 (1.53)		7.7 (1.49)	
Low (0–5)		57 (8.1)		18 (8.1)		98 (8.0)
Medium (6–8)		427 (60.6)		140 (63.1)		760 (61.7)
High (9, 10)		221 (31.3)		64 (28.8)		373 (30.3)
Satisfaction with health	7.2 (1.80)		7.5 (1.69)		7.3 (1.79)	
Low (0–5)		121 (17.2)		29 (13.1)		203 (16.5)
Medium (6–8)		425 (60.3)		128 (57.7)		729 (59.2)
High (9, 10)		159 (22.6)		65 (29.3)		299 (24.3)

Due to missing values, percentages do not add up to 100.

Discussion

In this study, more than one third of hospital physicians reported working six and more extra hours per week. More than half of all health professionals worked overtime. The majority, over 80%, of the respondents reported feeling that they were under time pressure (heavy workload), but were still more or less satisfied with their work and life. The strengths of the associations were depended on the profession of the study participants: physicians vs nurses vs other health professionals.

As to the first research question, temporal work stressors turned out to be inversely associated with satisfaction outcomes and mediated by general stress. Accordingly, general stress emerged as the strongest predictor of *dis*satisfaction in health professionals. Depending on the outcome

Table 3: Explaining general stress among health professionals - results of a stepwise multiple linear regression analysis (steps 1 and 2).

Dependent or outcome variable	General stress (not at all to a very large extent 0–4)	Nurses (n = 705)				Physicians (n = 222)				All health professionals (n = 1232)			
		Step 1		Step 2		Step 1		Step 2		Step 1		Step 2	
		beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value
Independent or exposure variables	Overtime hours (0–10+)	0.15	0.000	0.13	0.001	0.06	0.402	0.02	0.740	0.14	0.000	0.11	0.000
	Time pressure (0–3)	0.30	0.000	0.23	0.000	0.37	0.000	0.30	0.000	0.30	0.000	0.25	0.000
Intervening variables	Job autonomy (sum score 0–32)	–		−0.14	0.001	–		−0.11	0.141	–		−0.09	0.005
	Work climate (sum score 0-–4)	–		−0.19	0.000	–		−0.27	0.000	–		−0.22	0.000
Control variables	Gender (male)	−0.05	0.160	−0.04	0.302	−0.09	0.188	−0.09	0.207	−0.05	0.115	−0.03	0.263
	Age (<25, 25–34, 35–44, 45–54, 55+)	0.00	0.917	−0.01	0.785	−0.15	0.059	−0.09	0.296	−0.01	0.636	−0.02	0.433
	Job status (with supervisory position)	−0.07	0.084	−0.01	0.740	0.18	0.026	0.14	0.086	−0.03	0.294	−0.01	0.808
Adjusted R square		0.135		0.191		0.152		0.222		0.124		0.180	
No. cases in model		642		622		202		194		1131		1091	

Table 4a: Explaining job satisfaction among health professionals – results of a stepwise multiple regression analysis (step 0, steps 3 and 4)

Dependent or outcome variable	Satisfaction with work (0–10 rating scale, 10 = completely satisfied)	Nurses (n = 705)						Physicians (n = 222)						All health professionals (n = 1232)					
		Step 0		Step 3		Step 4		Step 0		Step 3		Step 4		Step 0		Step 3		Step 4	
		beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value
Independent or exposure variables	Overtime hours (0–10+)	−0.08	0.041	−0.01	0.775	−0.02	0.665	−0.18	0.010	−0.09	0.168	−0.09	0.168	−0.11	0.001	−0.04	0.171	0.05	0.105
	Time pressure (fully disagree to fully agree 0–3)	−0.27	0.000	−0.13	0.001	−0.13	0.001	−0.24	0.000	−0.06	0.339	−0.06	0.340	−0.24	0.000	−0.10	0.001	−0.10	0.001
Mediating or intervening variables	General stress (not at all to a very large extent 0–4)	–		−0.19	0.000	−0.17	0.000	–		−0.29	0.000	−0.28	0.000	–		−0.23	0.000	−0.21	0.000
	Job autonomy (sum score 0–32)	–		0.18	0.000	0.17	0.000	–		0.17	0.009	0.17	0.010	–		0.18	0.000	0.17	0.000
	Work climate (sum score 0–24)	–		0.30	0.000	0.28	0.000	–		0.36	0.000	0.34	0.000	–		0.28	0.000	0.26	0.000
	Control belief (sum score 0–6)	–		–		0.13	0.000	–		–		0.05	0.390	–		–		0.13	0.000
Control variables	Gender (male)	0.03	0.415	0.02	0.643	0.02	0.584	0.05	0.456	0.01	0.828	0.02	0.767	0.04	0.204	0.01	0.614	0.02	0.548
	Age (<25, 25–34, 35–44, 45–54, 55+)	0.08	0.030	0.10	0.005	0.10	0.003	0.22	0.005	0.15	0.027	0.15	0.033	0.11	0.000	0.13	0.000	0.14	0.000
	Job status (with supervisory position)	0.06	0.142	−0.03	0.420	−0.04	0.263	0.06	0.427	0.12	0.104	0.12	0.082	0.12	0.000	0.05	0.08	0.05	0.076
Adjusted R square		0.091		0.285		0.300		0.153		0.452		0.452		0.098		0.289		0.304	
No. cases in model		677		622		617		206		192		191		1179		1089		1080	

and the subgroup studied, up to 45% of the variance was thus explainable. Data showed to different extents the significant influence of temporal work stressors on the outcomes under study. As expected, the association was strongest for job satisfaction. Overtime often adds to the general stress of an already demanding job [43]. Similarly, stress and satisfaction in physicians were inversely correlated in a Canadian study; associations of other stressors and resources were not investigated [44]. In this study, overtime hours had no significant effect on physicians' general stress, as opposed to time pressure, even though extra hours of at least 3 and more per week on average were reported. This suggests that working extra hours is just one aspect of the temporal workload [45–48]. In Switzerland a maximum of 50 hours per week is stipulated by law, but on average the working time was still 56 hours per week in 2016, as a recent online survey revealed [49]. This highlights the problem that health professionals have limited time resources [15] and at the same time are under consistent time pressure [16]. In fact, limiting working hours may inadvertently have led to more time pressure. Studies in that realm may be little comparable between countries. Healthcare systems and health professionals' tasks may differ substantially between countries. For example, countries may allow fewer or a great deal more working hours than Switzerland does. This may substantially affect any outcome.

With regard to the second research question, general stress was observed to (most) strongly predict domain-specific satisfaction, sometimes only surpassed by resources such as work climate or internal control belief. These findings confirm the importance of a good working atmosphere. In this study, the vast majority of all health professionals considered their work in the team as positive. According to these data, a good work climate was associated with less general stress and better job satisfaction. This result is in line with other studies [50]. However, our results suggest that the effect of general stress, as a mediator in the relationship between temporal work stressors and satisfaction with work, differs between physicians and nurses. The stratified analyses revealed that among physicians the association of temporal work stressors (exposure variables) and job satisfaction (outcome variable) was fully mediated by general stress, whereas among nurses mediation by general stress was only partial and incomplete.

Regarding the third research question, a high control belief was strongly and positively associated with being more satisfied with life, health and work. According to the concept or construct of locus of control, individuals who have strong internal control feelings believe that they can largely determine their environment or their lives on their own. Conversely, individuals who have an external locus of control believe that their lives are determined by chance, luck or fate. Some authors view control belief as personality traits of importance for stress and conflict management [29, 51]. A recent study investigated the interactive relationship between the two control beliefs and job autonomy [52], and found that a combination of high job control,

Table 4b: Explaining satisfaction with life among health professionals – results of a stepwise multiple linear regression analysis (step 0, step 3 and 4).

Dependent or outcome variable	Satisfaction with life (0–10 rating scale, 10 = completely satisfied)	Nurses (n = 705)						Physicians (n = 222)						All health professionals (n = 1232)					
		Step 0		Step 3		Step 4		Step 0		Step 3		Step 4		Step 0		Step 3		Step 4	
		beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value
Independent or exposure variables	Overtime hours (0–10+)	−0.07	0.098	−0.01	0.842	−0.02	0.611	−0.08	0.263	−0.01	0.876	−0.03	0.662	−0.05	0.099	0.01	0.690	0.00	0.985
	Time pressure (fully disagree to fully agree 0–3)	−0.16	0.000	−0.04	0.404	−0.03	0.397	−0.12	0.095	0.05	0.551	0.05	0.451	−0.15	0.000	−0.01	0.704	−0.01	0.741
Mediating or intervening variables	General stress (not at all to a very large extent 0–4)	–		−0.38	0.000	−0.34	0.000	–		−0.28	0.000	−0.20	0.004		-0.36	0.000	-0.33	0.000	
	Job autonomy (sum score 0–32)	–		0.07	0.118	0.05	0.250	–		0.16	0.048	0.14	0.059		0.09	0.006	0.07	0.019	
	Work climate (sum score 0–24)	–		0.09	0.017	0.06	0.085	–		0.22		0.11	0.132		0.13	0.000	0.09	0.001	
	Control belief (sum score 0–6)	–		–		0.24	0.000	–		–		0.39	0.000		–		0.25	0.000	
Control variables	Gender (male)	−0.03	0.439	−0.04	0.315	−0.03	0.338	0.11	0.139	0.06	0.419	0.08	0.230	0.03	0.319	0.01	0.643	0.02	0.431
	Age (<25, 25–34, 35–44, 45–54, 55+)	0.03	0.443	0.04	0.257	0.05	0.133	0.14	0.113	0.05	0.576	0.04	0.606	0.03	0.291	0.04	0.166	0.06	0.043
	Job status (with supervisory position)	0.06	0.127	−0.00	0.961	−0.02	0.654	−0.02	0.824	0.02	0.786	0.04	0.608	0.04	0.232	−0.01	0.726	−0.01	0.699
Adjusted R square		0.031		0.191		0.242		0.026		0.193		0.319		0.025		0.191		0.250	
No. cases in model		677		622		617		208		194		193		1180		1090		1082	

high stressors and a strong internal control belief was a beneficial match. In the present study, we could also prove that the variable (internal) control belief was a strong predictor for being more satisfied with life, in particular for physicians. However, we investigated only internal control belief in our analyses. Still, our results support the findings that internal control belief as a personal resource also decides whether or not and to what extent a person is stressed and satisfied. Nevertheless, our data do not suggest that job autonomy is significantly correlated with physicians' general stress. A possible explanation might be that high levels of job autonomy in general were rarely reported by hospital employees. Limited job autonomy is recognised to be a common problem for both physicians and nurses in hospitals [1, 31, 53]. However, it is certainly of influence that nurses experience less or different levels of job autonomy than physicians. This is also reflected in the lower number of nurses in higher job positions who participated in this survey. Yet, hypothetically, a personality trait such as a feeling of being in control of one's life may overcome the general lack of autonomy of health professionals.

Implications

High workloads and resulting negative consequences, such as presenteeism, depression, burnout [54, 55] or leaving the profession may be counteracted by improved working conditions [1]. However, the precise relations between these factors have not been known so far. The results of this study suggest that temporal work overload generates general stress. However, this has not resulted in reducing the maximum permitted working time per week to satisfactory levels, as this may worsen physicians' education, training and experience [56]. Furthermore, the number of working hours may be less relevant than other aspects of job satisfaction. Thus, changes in measures of autonomy for physicians, including being allowed to increase working hours (rather than reduce them) and physicians' ability to obtain services for their patients, were identified as the strongest predictors of job satisfaction [57]. Therefore, the debate on work hours should ideally focus on the balance between protecting residents' health and caring for the patients [58] with the corresponding moral pressure. To prevent a future shortage of qualified health professionals, attractive working conditions would have to be somewhat adapted to employees' current needs and expectations, such as regarding work-life balance (e.g., work, leisure time, family, return). More than two thirds of the persons interviewed in this survey were women. This reflects the generally high proportion of women employed in health care. At present, 60% of students at medical faculties in Switzerland are women, with an increasing trend [59]. In the nursing profession, this relationship is traditionally even more prominent (more than 80% being female) [60]. In a recent survey of residents in internal medicine in Switzerland, women were more interested in part-time work and thus a different work-life balance [61]. Certainly, hospitals should become more family friendly, for example by establishing a comprehensive childcare infrastructure at or in proximity to the workplace [62] with opening hours in line with working hours of married or single health care professionals or perhaps by making leisure opportunities available [63]. Also, innovative flexible work time arrangements (e.g., attractive options for compensation of shift work, overtime) would possibly enable health professionals – both men and women – to have more time for family and rest [64].

Table 4c: Explaining satisfaction with life among health professionals – results of a stepwise multiple linear regression analysis (step 0, step 3 and 4).

Dependent or outcome variable	Satisfaction with health (0–10 rating scale, 10 = completely satisfied)	Nurses (n = 705)						Physicians (n = 222)						All health professionals (n = 1232)					
		Step 0		Step 3		Step 4		Step 0		Step 3		Step 4		Step 0		Step 3		Step 4	
		beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value	beta coeff. (β)	p-value
Independent or exposure variables	Overtime hours (0–10+)	0.01	0.811	0.04	0.288	0.03	0.393	0.05	0.497	0.05	0.564	0.04	0.649	0.05	0.142	0.09	0.007	0.08	0.011
	Time pressure (fully disagree to fully agree 0–3)	−0.15	0.000	−0.05	0.294	−0.04	0.307	−0.20	0.005	0.03	0.716	0.03	0.676	−0.16	0.000	−0.04	0.277	−0.03	0.346
Mediating or intervening variables	General stress (not at all to a very large extent 0–4)	–		−0.32	0.000	−0.28	0.000	–		−0.34	0.000	-0.31	0.000	–		−0.35	0.000	−0.33	0.000
	Job autonomy (sum score 0–32)	–		0.06	0.161	0.04	0.304	–		0.13	0.120	0.12	0.141	–		0.07	0.033	0.07	0.074
	Work climate (sum score 0–24)	–		0.05	0.203	0.03	0.506	–		0.03	0.704	−0.02	0.763	–		0.05	0.090	0.02	0.453
	Control belief (sum score 0–6)	–		–		0.24	0.00	–		–		0.17	0.019	–		–		0.21	0.000
Control variables	Gender (male)	0.00	0.982	0.01	0.855	0.01	0.772	−0.01	0.882	−0.07	0.335	−0.06	0.386	0.03	0.367	0.02	0.542	0.03	0.386
	Age (<25, 25–34, 35–44, 45–54, 55+)	0.02	0.577	0.02	0.705	0.02	0.515	0.01	0.942	−0.07	0.407	−0.07	0.405	−0.00	0.922	−0.00	0.927	0.01	0.773
	Job status (with supervisory position)	0.07	0.087	0.02	0.647	0.00	0.985	−0.10	0.267	−0.02	0.812	−0.02	0.832	0.04	0.227	0.01	0.762	0.01	0.821
Adjusted R square		0.021		0.126		0.182		0.022		0.113		0.135		0.024		0.151		0.193	
No. cases in model		677		622		617		208		194		193		1180		1090		1082	

However, the key question remains difficult to answer: Which influence is the most decisive in view of general stress and/or overall satisfaction in the workplace? In general, overtime by itself does not seem to be the main problem. However, there was evidence for overtime hours increasing risk of general stress in nurses. In a 2018 study, Hämmig showed that one out of six health professionals in this survey thought frequently of leaving the profession [33]. This supports our finding that these health professionals were a burdened group of employees. We assume that it is the meaningful aspect of working with patients, above all, that contributes to high overall satisfaction despite stress and limited job autonomy.

Strengths and limitations

Our study is limited in several ways. First, because of the cross-sectional and nonrandomised design of the study, no causal assumptions can be made. We analysed secondary data. Therefore, sample size calculation was not an issue. The survey data are not representative for healthcare professionals in general or for hospital employees in particular, and the findings are therefore limited in their generalisability. A systematic selection bias is possible, as the hospitals and employees involved may not have participated randomly (sample selection bias). In general, reasons for hospitals or institutions not participating could be to protect employees from substantial work overload, other existing employee surveys, or the operational need for action that would result from the survey. At the individual level, the reasons for participation or nonparticipation in the survey are also not verifiable. It might be that heavily overloaded and more dissatisfied employees did not participate. Therefore, an underestimation of general stress and dissatisfaction is possible (self-selection bias). Furthermore, employee satisfaction is not the same as engagement. We measured only overall satisfaction with work, life and health. Overall satisfaction can still be very high, but individual aspects can already be rated as unfavourable. No information on the clinical specialty of the participating physicians was available. Moreover, the number of years in clinical training cannot be specified. With regard to the measurement of resources, we did not capture other dimensions of personality (e.g., externality, conscientiousness, openness to experience), as the focus was not primarily on personality and job performance. Finally, the Cronbach's alpha for the work climate and locus of control scale was rather low. However, the Cronbach's alpha for internal locus of control was expected to be lower by using just two items.

Nevertheless, a major strength of this study is that the size of the entire study sample as well as of the subgroups was large enough to allow for stratified analyses and to mostly obtain statistically significant measures of association (beta coefficients), except for rather weak associations (beta coefficients of ±0.14 and below) in the numerically smallest subgroup of physicians. This study is innovative because it investigated the emerging topic of temporal work stressors in health professionals – and whether organisational or personal resources such as specific personality traits play an important role in this regard.

Conclusion

Work overload in the form of frequent or excessive overtime work or permanent time pressure at work is an important job stressor that can strongly affect the satisfaction and well-being of those concerned. This applies not only but particularly to health professionals. Organisational and personal resources, such as a high level of job autonomy, a good work climate, or a strong internal control belief, partly compensate for the negative consequences of temporal work stressors.

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